CASE REPORT

Double connective tissue graft to treat deep coronal-radicular abrasion: A 19-year follow-up case report

Debora Franceschi,* Giovan Paolo Pini Prato† and Riccardo Di Gianfilippo‡

Introduction: When gingival recession is combined with cervical abrasion, root coverage outcomes are less predictable due to the challenging adaptation of the connective tissue graft (CTG) to the marked root step. Removing additional tooth structure can improve soft-tissue adaptation with the downside of a possible increase in dental hypersensitivity or pulpitis. Therefore, the aim of this report was to demonstrate a surgical technique using two grafts which does not require any further modification of the root surface, in order to successfully treat recession associated with deep cervical abrasion.

Case presentation: A case of gingival recession associated with a deep root step and cemento-enamel junction alteration (B+; abrasion depth > 1 mm) was successfully treated via a bilaminar grafting technique using two CTG layers covered by a coronally advanced flap (CAF). The tooth surface was polished and did not receive any grinding, blending, planing, or other alterations. Complete recession coverage, complete abrasion coverage, and resolution of baseline sensitivity were achieved 1 year after surgical intervention and were maintained for 19 years with further coronal displacement of the gingival margin due to creeping attachment.

Conclusions: The double CTG technique showed optimal clinical results in terms of coverage and resolution of hypersensitivity of a recession associated with a deep cervical abrasion. No additional removal of dental tissue was needed, and the clinical outcomes were stably maintained over a long-term follow-up. *Clin Adv Periodontics* 2021;0:1–6.

Key Words: connective tissue; follow-up studies; gingival recession; reconstructive surgical procedures; surgical flap; treatment outcome.

Background

Surgical protocols have been proposed to treat gingival recessions associated with deep carious and non-carious cervical lesions,[1–3] but the goal to achieve good clinical outcomes in terms of coverage and reduced sensitivity remains challenging. Standard procedures consist in grinding the edges of the cervical lesion to improve the adaptation of the flap and of the graft on the tooth surface, and to prevent dead tracts underneath.[4] Removal of dental tissue, however, might induce an undesired increase in hypersensitivity if the root coverage after treatment is incomplete. Alternative approaches have been introduced; multidisciplinary treatments include restoration of the altered crown contour with resin composite to aid the outcome of plastic surgery procedures,[5] while more surgical approaches used multiple layers of soft tissue graft to fill the cervical step.[6]

The bilaminar technique was a significant improvement for periodontal plastic surgery and is currently acknowledged as the gold standard for treatment of gingival recession.[7,8] Studies elegantly clarified the key factors associated with clinical outcome after coverage procedure. Flap relaxation, thickness, tension free sutures, overcorrection of coronal advancement, and passive adaptation to

*Department of Clinical and Experimental Medicine, University of Florence, Florence, Italy

†Tuscany Academy of Dental Research (ATRO), Florence, Italy

‡Department of Periodontics and Oral Medicine, School of Dentistry, University of Michigan, Ann Arbor, Michigan, USA

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FIGURE 1 Facial view of the upper left first molar (#14). A deep non-carious cervical lesion (+) involving the cemento-enamel junction (B) was noted

FIGURE 2 The non-carious cervical lesion was more than 1 mm deep and altered the contour of the cemento-enamel junction

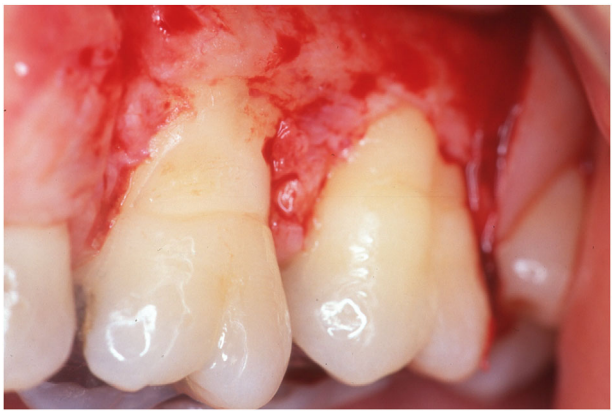

FIGURE 3 Recipient site preparation for the coronally advanced flap. Papillae were de-epithelialized; a split-thickness flap apical to the mucogingival junction allowed coronal advancement

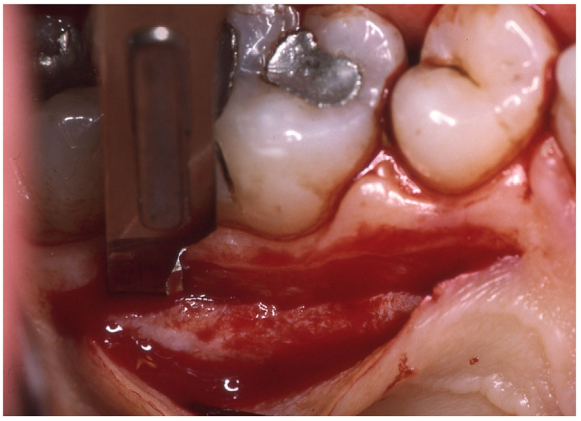

FIGURE 4 Collection of two subepithelial connective tissue grafts from the molar area of the left side of the palate using a single incision technique

cover the cemento-enamel junction (CEJ) were all associated with improved coverage.[9–11] Following the principles of periodontal plastic surgery, even in cases with deep cervical abrasions, it would be recommended to fill the abrasion with connective tissue graft (CTG),[7,8] collagen substitutes,[12] or resin composite to support the flap,[13] rather than removing tooth structure.

On the basis of this knowledge, the aim of the present article was to report on the surgical plastic strategy used to treat a case of gingival recession associated with deep cervical abrasion and to document successful clinical outcome and patient quality of life over a 19-year period.

Clinical Presentation and Case Management

A healthy 30-year-old man was referred to treat a gingival recession with deep cervical abrasion (Figures 1 and 2). The patients' chief concerns included cosmetic improvement, prevention of further recession progression, and addressing hypersensitivity. Double CTG covered by a coronally advanced flap (CAF) was the suggested treatment. Different therapeutic options were also discussed with the patient, who understood pros and cons of each and signed a written informed consent. The patient was also included in a previous case series.[6] The patient first received oral hygiene instructions to eliminate the traumatic hygiene habits related to the etiology of the recession. The patient was then treated with bilaminar technique using CAF and double CTG. No root planing or grinding were performed, and the exposed root abrasion was polished with no additional root surface treatment. After infiltration of local anesthetic, an intrasulcular incision[§] was performed on the buccal aspect of the involved tooth. It extended mesially and distally to include the adjacent papillae (Figure 3). Releasing incisions started from the mesial and distal extremities of the crevicular incision and passed the mucogingival junction (MGJ) following an oblique divergent design. Elevators[‖] were used to raise a full-thickness flap up to the MGJ, and a sharp dissection was used apical to the MGJ. The papillae mesial and distal to the recession were se-epithelialized, and two connective grafts were harvested from the palate (Figure 4). The first graft was positioned to completely cover the abrasion (Figure 5). The second was positioned on top of the first and extended laterally to reach the adjacent connective tissue (Figures 6 and 7) and was sutured to the periosteum

[§]B.P. 15c, Hu-Friedy, Chicago, IL, USA.

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FIGURE 5 The first connective tissue graft was adapted to the cervical abrasion without positioning sutures

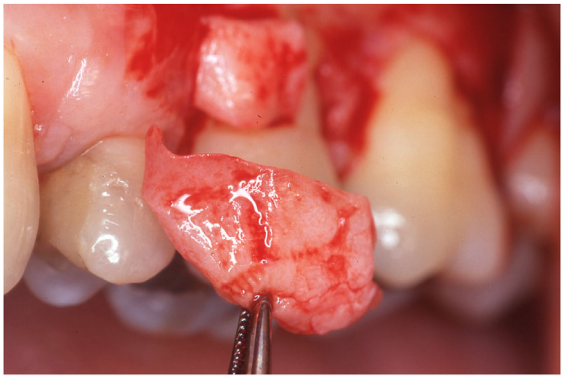

FIGURE 6 View of the second connective tissue graft, larger in size than the first

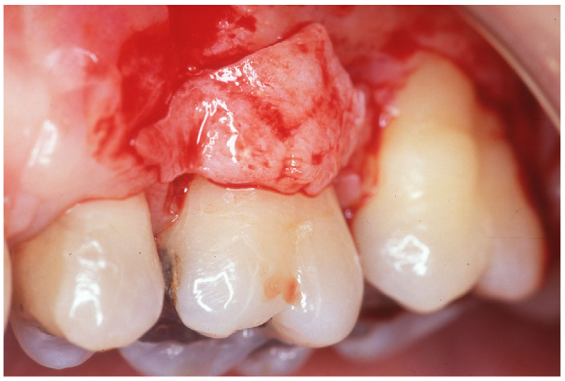

FIGURE 7 The second connective tissue graft was positioned to cover the first graft, the cemento-enamel junction, and the cervical root defect

with resorbable sutures (Figure 8). The flap was released from tension, coronally advanced and sutured over the CEJ, covering the underlying CTGs (Figure 9). Postoperative instructions as well as prescriptions for chlorhexidine digluconate and non-steroidal anti-inflammatory drugs were provided to the patient. After 10 days, the sutures were removed, and the patient was instructed to gently clean the surgical site with a cotton gauze and chlorhexidine digluconate. Three weeks after surgery, the patient was instructed to resume mechanical cleaning. The patient was recalled weekly during the first month, then monthly for the first year (Figure 10). Clinical evaluation 19 years after surgical treatment was reported in Figures 11 and 12.

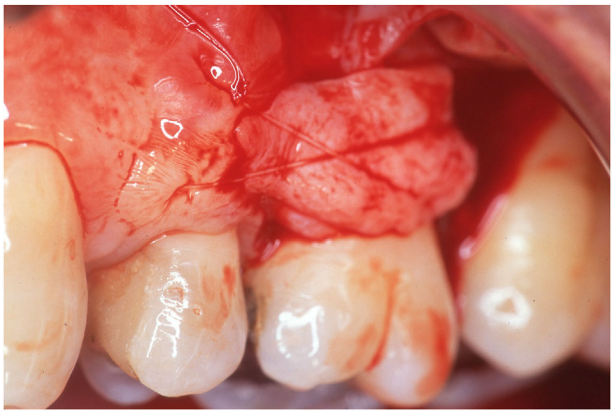

FIGURE 8 The outer connective tissue graft was kept in place with absorbable sutures anchoring it to the papillae, and to mesial and distal sites

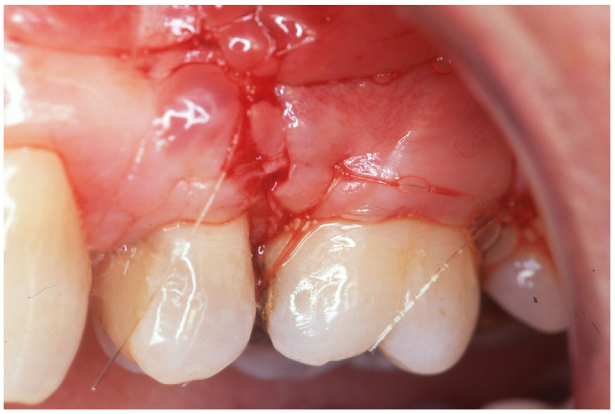

FIGURE 9 The flap was coronally advanced to cover the two connective tissue grafts

FIGURE 10 Successful complete root coverage was achieved 1 year after treatment

Clinical Outcomes

Periodontal measurements were taken at the mid-buccal site of the operated tooth using a UNC probe[¶] and 4x magnification lenses at baseline, 1 year, and 19 years after intervention (Table 1).

At the 1-year follow-up, complete root coverage was obtained, and the gingival margin completely covered the cervical abrasion. The distance between the incisal

[¶]PCP UNC 15, Hu-Friedy, Chicago, IL, USA.

TABLE 1 Patient-based data at baseline (T_0), 1 year after surgery (T_1) and 19 years after surgery (T_2)

	Sens	Miller's class	AAP/EFP class	Rec	PD	CAL	KT	IM GM	IM CE	CEJ step (mm)
T_0	Yes	1	RT1 B+	2	1.0	3.0	3.5	10.0	7.0	2
T_1	No	–	–	0.0	1.5	1.5	3.5	7.5	7	–
T_2	No	–	–	0.0	1.0	1.0	4	6.5	–	

Abbreviations: CAL, clinical attachment level; CEJ step, depth of abrasion measured at the deepest mid-point of buccal surface (mm); IM CE, incisal margin to coronal edge of the abrasion; IM GM, incisal margin to gingival margin; KT, keratinized tissue measured; PD, probing depth; Rec, recession depth measured at the mid-point of buccal surface; Sens, dental hypersensitivity.

FIGURE 11 Complete root coverage was maintained over 19 years, with progressive coronal displacement of the gingival margin due to creeping attachment

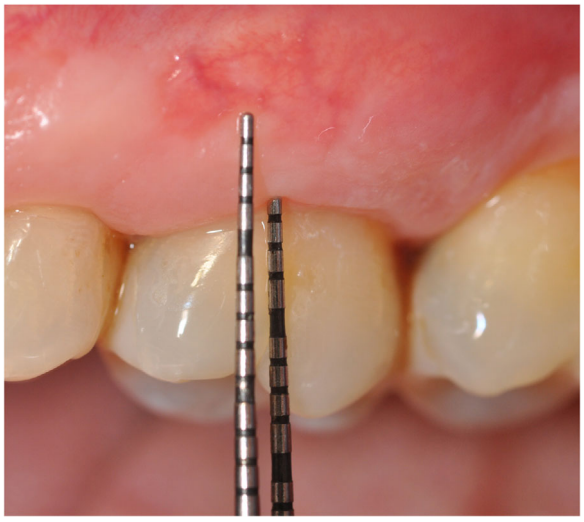

FIGURE 12 Probing during the follow-up period showed shallow sulcular depth and successful connective tissue adhesion to the area where the root step was previously visible

and gingival margins (IM GM_{T1}) was 7.5 mm, and the distance between the incisal margin and coronal edge of the abrasion (IM CE_{T1}) was 7 mm. the overall recession reduction was 2 mm, and the amount of keratinized tissue remained stable.

At the 19-year follow-up, a small amount of creeping attachment was observed. The distance between incisal and gingival margins (IM GM_{T2}) decreased to 6.5 mm, and the coronal edge of the abrasion was not identifiable. Root hypersensitivity was not present at both the 1 year and 19-year follow-ups.

Discussion

Literature was published to investigate factors predictive of favorable or unfavorable outcomes after root coverage procedures. Adding a CTG during CAF showed to improve recession coverage in the short term and outcome stability in the long term.[14] In addition, CTG-based approaches were associated with further coronal displacement of the gingival margin over the follow-up period, known as creeping attachment.[14] Regarding host-related factors, a 20-year study on CAF+CTG showed how baseline recession diagnosis, narrow KT, and cervical abrasion negatively affected stability of the gingival margin.[8] Previous literature clearly established that surface characteristics play a crucial role on outcomes after root coverage, and a classification of cervical defects (CDs) was developed to facilitate diagnosis as well as treatment of recessions with cervical abrasion defects.[15,16] The proposed four classes rely on the visibility of the CEJ (A: detectable; B: non detectable) and on the presence of surface discrepancies (+: presence of root steps; -: absence of root steps). Gingival recessions associated with severe CDs challenge flap adaptation and alter the position of the CEJ (B+). Proposed approaches advocated for further removal of tooth structure to blend the edges created by the CD, while others follow a multidisciplinary interaction that requires a periodontal and restorative collaboration.[3] Alternatively, the present report showed how a surgical approach alone with double CTG successfully covered the recession and reduced dental sensitivity without the need of further restorative treatment of the root surface. Correct oral hygiene instruction and a stringent maintenance protocol contributed to the success of this case.[17,18] Within the limits of this single case, the clinical condition after 19 years showed an optimal esthetic result and complete resolution of baseline hypersensitivity. The clinical results for root coverage remained stable over 19 years, despite the presence of a deep cervical abrasion. The amount of KT slightly increased during the follow-up period, and a limited creeping attachment phenomenon was observed.■

Summary

Why is this case new information?	■ This case report shows how a double connective tissue graft procedure can be used to achieve and maintain complete root coverage of a B+ gingival recession associated with a deep cervical abrasion, without modifying the root surface.
What are the keys to successful management of this case?	■ Keys for complete root coverage, reduction in sensitivity, and long-term stability were: • Patient instruction on the traumatic etiology of the gingival recession. • Complete fill of the root abrasion with a soft tissue graft. • No further removal of tooth structure.
What are the primary limitations to success in this case?	■ Further clinical trials on the double connective tissue graft technique need to be conducted to better investigate advantages, limitations, and case selection of the technique, and to validate the described results.

Conflict of Interest

The authors reported no conflicts of interest related to this study.

Correspondence
Debora Franceschi, Department of Clinical and Experimental Medicine, University of Florence, Largo Brambilla 3, Florence, Italy.
Email: debora.franceschi@unifi.it

References

1. Miller PD, Jr. Root coverage using the free soft tissue autograft following citric acid application. II. Treatment of the carious root. Int J Periodontics Restorative Dent. 1983;3:38–51.
2. Pini Prato GP, Tinti C, Cortellini P, Magnani C, Clauser C. Periodontal regenerative therapy with coverage of previously restored root surfaces: case reports. Int J Periodontics Restorative Dent. 1992;12:450–461.
3. Zucchelli G, Gori G, Mele M, et al. Non-carious cervical lesions associated with gingival recessions: a decision-making process. J Periodontol. 2011;82:1713–1724.
4. Holbrook T, Ochsenbein C. Complete coverage of the denuded root surface with a one-stage gingival graft. Int J Periodontics Restorative Dent. 1983;3:8–27.
5. Santamaria MP, Ambrosano GM, Casati MZ, Nociti Junior FH, Sallum AW, Sallum EA. Connective tissue graft plus resin-modified glass ionomer restoration for the treatment of gingival recession associated with non-carious cervical lesion: a randomized-controlled clinical trial. J Clin Periodontol. 2009;36:791–798.
6. Pini-Prato G, Baldi C, Rotundo R, Franceschi D, Muzzi L. The treatment of gingival recession associated with deep corono-radicular abrasions (CEJ step) - a case series. Perio. 2004;1:57–66.
7. Barootchi S, Tavelli L, Di Gianfilippo R, et al. Long term assessment of root coverage stability using connective tissue graft with or without an epithelial collar for gingival recession treatment. A 12-year follow-up from a randomized clinical trial. J Clin Periodontol. 2019;46:1124–1133.
8. Pini Prato G, Franceschi D, Cortellini P, Chambrone L. Long-term evaluation (20 years) of the outcomes of subepithelial connective tissue graft plus coronally advanced flap in the treatment of maxillary single recession-type defects. J Periodontol. 2018;89:1290–1299.
9. Baldi C, Pini-Prato G, Pagliaro U, et al. Coronally advanced flap procedure for root coverage. Is flap thickness a relevant predictor to achieve root coverage? A 19-case series. J Periodontol. 1999;70:1077–1084.
10. Pini Prato G, Pagliaro U, Baldi C, et al. Coronally advanced flap procedure for root coverage. Flap with tension versus flap without tension: a randomized controlled clinical study. J Periodontol. 2000;71:188–201.
11. Pini-Prato G, Baldi C, Pagliaro U, et al. Coronally advanced flap procedure for root coverage. Treatment of root surface: root planning versus polishing. J Periodontol. 1999;70:1064–1076.
12. Barootchi S, Tavelli L, Di Gianfilippo R, et al. Acellular dermal matrix for root coverage procedures. 9-year assessment of treated isolated gingival recessions and their adjacent untreated sites. J Periodontol. 2020;92(2):254–262.
13. Cairo F, Cortellini P, Nieri M, et al. Coronally advanced flap and composite restoration of the enamel with or without connective tissue graft for the treatment of single maxillary gingival recession with non-carious cervical lesion. A randomized controlled clinical trial. J Clin Periodontol. 2020;47:362–371.
14. Tavelli L, Barootchi S, Cairo F, et al. The effect of time on root coverage outcomes: a network meta-analysis. J Dent Res. 2019;98:1195–1203.
15. Pini-Prato G, Franceschi D, Cairo F, Nieri M, Rotundo R. Classification of dental surface defects in areas of gingival recession. J Periodontol. 2010;81:885–890.
16. Pini Prato G, Di Gianfilippo R. On the value of the 2017 classification of phenotype and gingival recessions. J Periodontol. 2020;92(5):613–618.
17. Nieri M, Giani M, Pagliaro U, Picciullo A, Franceschi D, Rotundo R. Efficacy and preference of manual toothbrushes: a randomised, single blind, controlled trial. Eur J Oral Implantol. 2013;6:181–188.
18. Nieri M, Giuntini V, Pagliaro U, Giani M, Franchi L, Franceschi D. Efficacy of a U-shaped automatic electic toothbrush in dental plaque removal: a cross-over randomized controlled trial. Int J Environ Res Pubblic Health. 2020;17:4649.